

REMARKS

INTRODUCTION:

In accordance with the foregoing, claims 6 and 7 have been canceled without prejudice or disclaimer, claim 1 has been amended, and claim 12 has been added. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1-5, 8-10, and 12 are pending and under consideration.

REJECTION UNDER 35 U.S.C. §102:

In the Office Action, at page 2, item 2, the Examiner rejected claims 1-7 under 35 U.S.C. §102(b) as being anticipated by Otto (US 4,770,548 – hereinafter Otto '548). The reasons for the rejection are set forth in the Office Action and therefore not repeated. Applicants traverse this rejection and respectfully request reconsideration.

In the Office Action, at page 2, item 3, the Examiner rejected claims 1-7 under 35 U.S.C. §102(b) as being anticipated by Otto (US 5,129,744 – hereinafter Otto '744). The reasons for the rejection are set forth in the Office Action and therefore not repeated. Applicants traverse this rejection and respectfully request reconsideration.

Claims 6 and 7 have been cancelled without prejudice or disclaimer.

Amended, independent claim 1 recites: "...wherein the innermost sealing lip is a non-contact sealing lip leaving a gap between a free end thereof and the sealing surface of the sealing contact member, a size of the entire gap gradually increases in a direction away from the sealing surface area and inwardly of the annular working space, said gap being of a size sufficient to permit flow of air therethrough, and prevent a lubricant from passing therethrough and to provide a non-contact sealing effect when a relative rotation takes place between the outer and inner members."

Otto '548 discloses a wheel bearing assembly with a seal B. The seal B has an elastomeric sealing element 26 that has a primary lip 34 and a secondary lip 36. There is a clearance c between a cylindrical face 38 of the primary lip 34 and a cylindrical sealing surface 14 of a cone 8. (See Otto, at FIG. 2, and col. 4, lines 9-39). Additionally, in Otto '548, neither cylindrical face 38 nor cylindrical sealing surface 14 are continuous, but instead, they are interrupted by cavities 44 configured to pump lubricant that enters the cavities 44 back toward rollers. (See Otto '548, at FIG. 3, and col. 4, lines 46-50).

Otto '744 discloses a labyrinth lip 76 with pumping cavities, whose operation is the same as that described in Otto '548. (See Otto '744, at FIG. 5, and col. 5, lines 27-46).

Applicants respectfully submit that neither Otto '548 nor Otto '744, either alone or in combination, disclose or suggest "...wherein... a size of the entire gap gradually increases in a direction away from the sealing surface area and inwardly of the annular working space...."

Applicants respectfully submit that, as disclosed in a non-limiting embodiment in the subject application, gaps defined between free ends of non-contact sealing lips 10a and 12a and sealing surfaces 2c and 15aa, respectively, are of a tapered shape. (See Specification, at FIGS. 2B and 3B, page 12, line 19 to page 13, line 7, and page 14, line 8 to page 15, line 11). Such tapered-shaped gaps are effective in purging air inside the annular working space to the outside, especially when the air is thermally expanded due to heat evolved during the operation of the wheel support bearing assembly. Additionally, such tapered-shaped gaps are effective in controlling a gap dimension with little variation, as compared to gaps with a labyrinth seal structure, such as those disclosed in Otto '548 and Otto '744. The reason for such effective gap dimension control, as can be seen in FIG. 2B of the subject Specification, is that the gap between the free end face 10aa of the sealing lip 10a and the sealing surface area 2c has a mean dimension that is larger than the gap $\delta 1$. Accordingly, deviation of the gap dimension $\delta 1$ does not largely effect deviation of such a mean dimension.

Accordingly, Applicants respectfully submit that independent claim 1 patentably distinguishes over the cited art, and should be allowable for at least the above-mentioned reasons. Further, Applicants respectfully submit that claims 2-5, which ultimately depend from independent claim 1, should be allowable for at least the same reasons as claim 1, as well as for the additional features recited therein.

REJECTION UNDER 35 U.S.C. §103:

In the Office Action, at page 3, item 5, the Examiner rejected claims 1-8 and 10 under 35 U.S.C. §103(a) as being unpatentable over Applicants' Admitted Prior Art (APA) in view of Otto '548. The reasons for the rejection are set forth in the Office Action and therefore not repeated. Applicants traverse this rejection and respectfully request reconsideration.

In the Office Action, at page 4, item 6, the Examiner rejected claims 1-9 under 35 U.S.C. §103(a) as being unpatentable over Nagase (U.S. 6,168,315 – hereinafter Nagase) in view of Otto '548. The reasons for the rejection are set forth in the Office Action and therefore not repeated. Applicants traverse this rejection and respectfully request reconsideration.

Claims 6 and 7 have been cancelled without prejudice or disclaimer.

As noted in the section regarding the rejection under 35 U.S.C. §102, Applicants respectfully submit that Otto '548 neither discloses or nor suggests "...wherein...a size of the entire gap gradually increases in a direction away from the sealing surface area and inwardly of the annular working space...."

Since neither APA nor Nagase disclose or suggest even a non-contact sealing lip, Applicants respectfully submit that none of APA, Nagase, or Otto '548, either alone or in combination, disclose or suggest every element of independent claim 1, arranged as required by claim 1.

Accordingly, Applicants respectfully submit that independent claim 1 patentably distinguishes over the cited art, and should be allowable for at least the above-mentioned reasons. Further, Applicants respectfully submit that claims 2-5, and 8-10, which ultimately depend from independent claim 1, should be allowable for at least the same reasons as claim 1, as well as for the additional features recited therein.

NEW CLAIM:

Applicants respectfully submit that for at least similar reasons as those stated in the section regarding the rejection under 35 U.S.C. §102, new claim 12 patentably distinguishes over the cited art and should be allowable.

CONCLUSION:

In accordance with the foregoing, Applicants respectfully submit that all outstanding objections and rejections have been overcome and/or rendered moot, and further, that all pending claims patentably distinguish over the cited art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

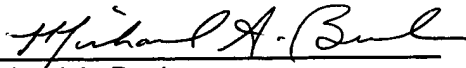
If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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